

REMARKS

(1) Claims 1-13 and 15 are pending in this application, of which claims 1, 3, 4 and 15 have been amended. No new claims have been added.

(2) The specification was objected to because the specification does not refer to figure 11. Page 2 of the Office Action.

In this Response, the specification has been amended. Withdrawal of the objection is respectfully requested.

(3) Claim 14 was rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Page 2 of the Office Action.

In this Response, claim 14 has been cancelled. Thus, the rejection made moot.

(4) Claims 1-4, 6-7 and 14-15 were rejected under 35 U.S.C. §103(a) as being unpatentable over the obvious modification of Swift (U.S. Patent No. 6,032,464). Page 3 of the Office Action. Claims 1-4, 6-7 and 14-15 were rejected under 35 U.S.C. §103(a) as being unpatentable over the obvious modification of Swift (U.S. Patent No. 6,032,464) using an alternative interpretation of the gas injection apparatus. Page 5 of the Office Action. Claims 1-4, 6-7 and 14-15 were

rejected under 35 U.S.C. §103(a) as being unpatentable over Swift (U.S. Patent No. 6,032,464) in view of Wighard (U.S. Patent No. 5,813,234). Page 8 of the Office Action. Claims 1-4, 6-7 and 14-15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Swift (U.S. Patent No. 6,032,464) and in view of Garrett (U.S. Patent No. 5,953,921). Page 10 of the Office Action. Claims 1-4, 6-7 and 14-15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Swift (U.S. Patent No. 6,032,464) in view of Garrett (U.S. Patent No. 5,647,216). Page 13 of the Office Action.

In this Response, claim 1 has been amended to recite “a loop tube inside which helium is injected.” Claim 1 has been also amended to recite the first gas injection means for injecting argon. This means is a means-plus-function claim under 35 U.S.C. §112, sixth paragraph. The corresponding structure, material and act are described at e.g., page 23, lines 3 to 9 of the original specification.

As described at page 22, lines 19-24, first helium having a small Prandtl number and a small specific gravity is enclosed in the loop tube 2. Then, an acoustic wave is generated rapidly. Subsequently, argon, having a large Prandtl number and a large specific gravity, is injected in order to reduce the sound velocity of the acoustic wave generated.

As described at page 22, lines 19-24, argon is injected uniformly into the right and left linear tube portions 2a. By doing so, argon having a relatively large specific gravity flows downward and the gases inside the loop tube become homogeneous.

Due to the “first gas injection means,” after injecting helium and generating the travelling wave, argon is injected inside the loop tube uniformly to flow outwardly in both directions from the center of the first connection tube portion, and then, to flow downward inside the first linear tube portion and the second linear tube portion of the loop tube, as recited in amended claim 1.

As admitted by the Examiner, Swift does not teach injecting argon or helium. E.g., page 6, last lines 5-1 of the Office Action. Amended claim 1 recites the first gas injection means, that is required to function as recited in the claim. It is unpredictable to modify Swift to obtain the claimed invention.

As secondary references, the Examiner cites Wighard, Garrett (US 5,953,921) and Garrett (US 5,647,216). However, Wighard merely teaches the fluid of a mixture of helium, argon and/or neon (col. 1, lines 36-37). Garrett (US 5,953,921) merely teaches controlling the concentration of gas species (col. 4, lines 20-27). Garrett (US 5,647,216) merely teaches a mixture of argon and helium, or a mixture of helium and xenon (col. 8, lines 1-2). Nothing in the secondary references teaches or suggests the claimed first gas injection means. Even a

combination of the references does not make the claimed invention. Amended claim 1 is not obvious over the references.

Claim 15 has been amended to depend on claim 1. Amended claim 15 recites the second gas injection means for injecting helium. The means is a means-plus-function claim under 35 U.S.C. §112, sixth paragraph. The corresponding structure, material and act are described at e.g., page 23, lines 10-15 of the original specification. None of the references discloses or teaches the invention of claim 15.

(5) Claims 5-6, 11 and 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over any of the rejections above and further in view of Swift (U.S. Patent No. 6,164,073). Page 15 of the Office Action.

The same arguments above apply to this rejection. Reconsideration of the rejection is respectfully requested.

(6) Claim 12 was rejected under 35 U.S.C. §103(a) as being unpatentable over any of the rejections above and further in view of Smith (U.S. Publication No. 2003/0192324). Page 17 of the Office Action.

The same arguments above apply to this rejection. Reconsideration of the rejection is respectfully requested.

(7) Claim 12 is rejected under 35 U.S.C. §103(a) as being unpatentable over any of the rejections above and further in view of Blaire (U.S. Patent No. 4,057,962). Page 17 of the Office Action.

The same arguments above apply to this rejection. Reconsideration of the rejection is respectfully requested.

(8) In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

Application No. 10/594,278
Art Unit: 3744

Amendment under 37 C.F.R. §1.111
Attorney Docket No. 063029

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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